

16 JUL 1999 19:10:05 U.S. Patent & Trademark Office P0002  
=> set pag scr;act t1/a;d 62 .finalreport ab kwic  
SET COMMAND COMPLETED

L1 QUE PLU=ON CORRELAT#### OR RELAT#####  
L2 QUE PLU=ON EQUIVALENT OR SAME  
L3 QUE PLU=ON LIKE OR SIMILAR  
L4 QUE PLU=ON SEARCH##### OR MIN####  
L5 QUE PLU=ON FIND##### OR RETRIEV#####  
L6 QUE PLU=ON DATA OR DATABASE  
L7 QUE PLU=ON INFORMATION OR CATALOG  
L8 ( 79123)SEA FILE=USPAT PLU=ON L1 (5A) L6  
L9 ( 61314)SEA FILE=USPAT PLU=ON L2 (5A) L6  
L10 ( 37628)SEA FILE=USPAT PLU=ON L3 (5A) L6  
L11 ( 55580)SEA FILE=USPAT PLU=ON L1 (5A) L7  
L12 ( 26824)SEA FILE=USPAT PLU=ON L2 (5A) L7  
L13 ( 18660)SEA FILE=USPAT PLU=ON L3 (5A) L7  
L14 ( 4280)SEA FILE=USPAT PLU=ON (L4 OR L5) (5A) (L8 OR L9 OR L10)  
L15 ( 2498)SEA FILE=USPAT PLU=ON (L4 OR L5) (5A) (L11 OR L12 OR L13)  
L16 ( 29329)SEA FILE=USPAT PLU=ON L4 (5A) L6  
L17 ( 29749)SEA FILE=USPAT PLU=ON L5 (5A) L6  
L18 ( 11854)SEA FILE=USPAT PLU=ON L4 (5A) L7  
L19 ( 17650)SEA FILE=USPAT PLU=ON L5 (5A) L7  
L20 ( 3859)SEA FILE=USPAT PLU=ON (L14 OR L15) (P) (L16 OR L17)  
L21 ( 499)SEA FILE=USPAT PLU=ON (L14 OR L14) (P) (L18 OR L19)  
L22 QUE PLU=ON COLLECT#### OR ASSEMBL#####  
L23 QUE PLU=ON ACCUMULAT#### OR CATEGOR#####  
L24 QUE PLU=ON L22 OR L23  
L25 QUE PLU=ON PRODUCT OR ITEMS  
L26 ( 101900)SEA FILE=USPAT PLU=ON (L6 OR L7 OR L25) (5A) L24  
L27 ( 1074)SEA FILE=USPAT PLU=ON (L20 OR L21) (L) L26  
L28 ( 2152)SEA FILE=USPAT PLU=ON (L16 OR L17 OR L18 OR L19) (10A) L26  
L29 231 SEA FILE=USPAT PLU=ON L27 (L) L28

US PAT NO: 5,778,355 [IMAGE AVAILABLE] L29: 62 of 231  
DATE ISSUED: Jul. 7, 1998  
TITLE: \*\*Database\*\* method and apparatus for interactively \*\*retrieving\*\*  
\*\*data\*\* members and \*\*related\*\* members from a  
\*\*collection\*\* of \*\*data\*\*  
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APPL-NO: 08/664,212  
DATE FILED: Jun. 11, 1996  
US-CL-CURRENT: 707/2, 4, 102, 103, 104

US PAT NO: 5,778,355 [IMAGE AVAILABLE] L29: 62 of 231  
 DATE ISSUED: Jul. 7, 1998  
 TITLE: **\*\*Database\*\*** method and apparatus for interactively **\*\*retrieving\*\***  
**\*\*data\*\*** members and **\*\*related\*\*** members from a  
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 US-CL-CURRENT: 707/2, 4, 102, 103, 104

**ABSTRACT:** A method of, and system for, interactively accessing information in response to a user command having a predefined operator and specifying one of a plurality of collections of information. The collections of information are stored in an object-oriented database in a hierarchical arrangement of data members. The hierarchical arrangement can include one level of data members and in which one of the data members is composed of a next level of data members. Each data member is stored according to one of a system-specified and a user-specified storage definition. A set of user-specified storage definitions is defined from the plurality of storage definitions. Upon detecting the user command, the specified collection of information is analyzed to determine which data members of the one level are stored according to one of the storage definitions of the set. Each data member not in the set is added to a projection list; each data member in the set is expanded into a next level of data members composing the data member in the set. Expanding can include analyzing each data member of the next level to determine whether it is in the set and if so again expanding up until a specified level of expanding. The projection list is processed to return to the user the information corresponding to the data members in the projection list. The invention may be implemented in a Parser layer of a known layered architecture for database systems.

**TITLE:** **\*\*Database\*\*** method and apparatus for interactively **\*\*retrieving\*\*** **\*\*data\*\*** members and **\*\*related\*\*** members from a **\*\*collection\*\*** of **\*\*data\*\***

**BSUM(2)** This invention relates to database systems and, more particularly, to a **\*\*database\*\*** operator that **\*\*retrieves\*\*** members and **\*\*related\*\*** members from **\*\*collections\*\*** of **\*\*data\*\*** in an object-oriented system.

**BSUM(14)** More particularly, in OODB systems, the **\*\*data\*\*** may be arranged as **\*\*collections\*\*** of objects or instances stored in accordance with user- or system-specified definitions. The user- and system-specified definitions are known by. . .

**BSUM(29)** Exodus . . . and define the Excess query language. In addition to tuple constructors, which create objects of the class corresponding to the **\*\*database\*\***'s **\*\*collection\*\***, the Extra **\*\*data\*\*** model provides four types of constructors: ref, own ref, set, and array. In short, these four types of constructors are. . .

**BSUM(33)** Consequently, there is a need in the art for an improved method of, and apparatus for, interactively accessing **\*\*data\*\*** within a **\*\*collection\*\*** of **\*\*data\*\***. Moreover, there is a need for a method and system that allows interactive users to obtain **\*\*data\*\*** from **\*\*collections\*\*** of object-oriented **\*\*data\*\*** in a manner that does not require the user to understand the data schema, i.e., the manner in which one. . .

BSUM(35) The invention provides a system for, and method of, interactively accessing **\*\*information\*\*** from a **\*\*collection\*\*** of **\*\*information\*\*** in response to a user command having a predefined operator and specifying one of a plurality of **\*\*collections\*\*** of **\*\*information\*\*** in which the **\*\*collections\*\*** of **\*\*information\*\*** is in an object-oriented database in a multi-level hierarchical arrangement of data members. One level of the hierarchical arrangement is. . .

BSUM(37) Upon detecting the user command, the invention analyzes the **\*\*collection\*\*** of **\*\*information\*\***, specified in the user command, to determine which data members of the one level are stored according to one of. . .